NBC Defense Concepts

ACTION: Describe NBC Defense Concepts

CONDITION: Given Class Slides and Class Notes

STANDARD: Describe U.S. National Policy governing the use of Weapons of Mass Destruction (WMD). Describe the five major concepts of NBC defense. Describe the characteristics of WMD, the effects of weather and terrain on their use, and the effects WMD have on humans. Describe the tactical significance of NBC hazard areas and the operational use of downwind hazard predictions. Identify components of the NBC Warning and Reporting System (NBCWRS).

Agenda

- Historical Perspective
- Worldwide NBC Capabilities
- NBC weapons / Employment & Defense
- U.S. National Policy
- NBC Warning and Reporting System
- NBC Equipment, MOPP, M40 Mask

Historical Perspective

- WWI Gas Ypres, Belgium
- Between the World Wars
- Post WWII
- Post Desert Shield / Desert Storm

Worldwide NBC Capabilities

- Motivations to Acquire or Develop NBC Capability
- Regional NBC programs
- Non-state NBC Programs
- Proliferation / Outlook

Motivations to Acquire or Develop NBC Capability

- Regional threat perceptions
- Perception of utility
- Prestige
- Cost

Southwest Asia

	Nuclear	Chemical	Biologica
North Korea	Possible	yes	Y
China	Yes	Yes	Y
India	Yes	Yes	N
Pakistan	Yes	Yes	N

Middle East & North Africa

	Nuclear	Chemical	Biologic
Iran	R&D	Yes	Ye
Iraq	R&D	Yes	Y
Libya	R&D	Yes	Y
Syria	No	Yes	Unkn

Russia

Nuclear	Chemical	
Biological Yes Yes	Yes	

Non-state use of WMD

Incident exampl

1995: Aum Shinrikyo cult attacks Tokyo subway with Sarin

Plan to murder US Marshal & IRS agent with ricin

1995 & 1993: Aum Shinrikyo members confess to using anthrax and botulinim toxin against targets in Japan

1986: Typhoid bacteria disseminated by cult members

1984: Attempt to purchase botulism and tetanus

Dangers of Proliferation

Potential for mass casualties

Affect regional stability

Threaten resource supply

Difficult to counter

Outlook

Lower Threshold for Use:

Has been used in military conflicts
Has been used by terrorist groups
Seen as more acceptable option

Most active WMD programs will continue with trend toward increasing sophistication in agents & delivery

Treaties will not end the threat

Proliferation is of great concern

NBC Weapons, Employment and Defense

Four Generations of Chemical Warfare Agents

1st generation:

Choking Agents: Chlorine, Phosgene

Blood Agents: Hydrogen Cyanide & Cyanogen Chloride

Blister Agents: Sulfur Mustard, Lewisite

2nd generation:

G-series nerve agents: Tabun, Sarin, Soman

3rd generation:

V-series nerve agents: VE, VG, VM, VS, and VX

4th generation: "Novichok"

Nonlethal Agents

Riot Control Agents:

- Tear Gas Agents: CS, CN
- Vomiting Agents: Adamsite, Diphenyl Chloroar

Incapacitants:

- Psychochemicals: LSD, BZ

Types of Chemical Agents

Used throughout the depth of the battlefield, against frontline troops, to protect flanks, disrupt command & control, logistics and personnel replacement system in the BSA/DSA.

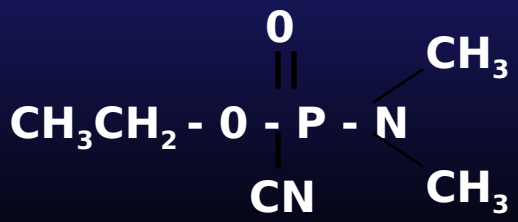
Nerve - primary threat to U.S. military, high toxicity, lethality, multiple routes of entry

Blister- second only to nerve agents for military, delay in the onset of recognizable symptoms, small amounts needed, non-lethal system damage … but can result in death

Blood - disrupt oxygen use by living cells

Nerve Agent - TABUN (GA)

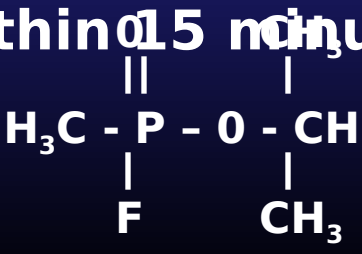
- **Enters body: Respiratory track and eyes**
- **Color and Smell: Colorless to brown liquid, fruity odor**
- **Treatment: Mark - I (Atropine & 2 Pam Chloride) … <u>3 max</u> For severe case - give all 3 simultaneously + CANA**
- **Symptoms: Difficulty breathing, nausea, vomiting, weakness.**
- **Decon: M291, flush eyes w/water, DS2/STB, soap / detergents**
- **Persistency: NP, evaporates about 20 times slower than water**
- **Rate of Action: Very rapid**



Nerve Agent - SARIN (GB)

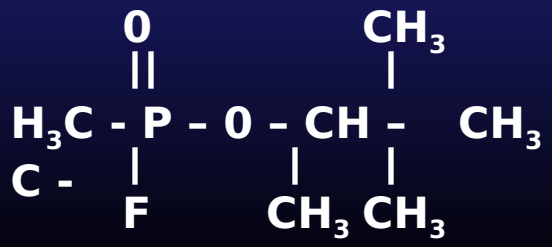
- **Enters body: Primary inhalation threat, toxic through eyes & skin**
- **Color and Smell: Colorless, no odor**
- **Treatment: Mark - I (Atropine & 2 Pam Chloride) … 3 max For severe case - give all 3 simultaneously + CANA**
- **Symptoms: Difficulty breathing, nausea, vomiting, weakness.**
- **Decon: M291, flush eyes w/water, DS2/STB, soap / detergents**
- **Persistency: NP, evaporation about the same as water**
- **Rate of Action: Very rapid, death within 15 minutes**

Used In Tokyo City Subway Bombing !



Nerve Agent - SOMAN (GD)

- **Enters body: Primary inhalation threat, toxic through eyes & skin**
- **Color and Smell: Colorless, fruity odor (Camphor)**
- **Treatment: Mark - I (Atropine & 2 Pam Chloride) … 3 max**
  For severe case - give all 3 simultaneously + CANA
- **Symptoms: Difficulty breathing, nausea, vomiting, weakness.**
- **Decon: M291, flush eyes w/water, DS2/STB, soap / detergents**
- **Persistency: Evaporates about 4 times slower than water**
- **Rate of Action: Very rapid, death within 15 minutes**



MOST POISONOUS

OF NERVE AGENTS

Nerve Agent - VX

Enters body: Toxic through eyes & skin, 100x more toxic than GB

Color and Smell: No odor, amber color, oily liquid (motor oil)

Treatment: Mark - I (Atropine & 2 Pam Chloride) … 3 max
For severe case - give all 3 simultaneously + CANA

Symptoms: Difficulty breathing, nausea, muscle twitching

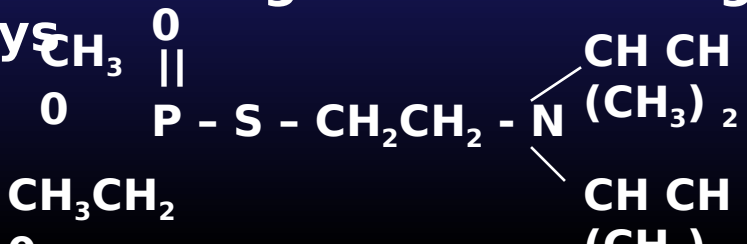
Decon: M291, flush eyes w/water, DS2/STB, soap / detergents

Persistency: Evaporates 1,500 times slower than GB/GA, very persistent!

Rate of Action: Very rapid, death within 15 minutes

Persistent agents generally last from days to weeks to months

Non-persistent agents last from generally lasts from min to hrs to days



Novichok - Next Generation

- **Enters body: Unknown**
- **Color and Smell: Odorless, colorless, oily substance**
- **Treatment: Mark - I (Atropine & 2 Pam Chloride)**
- **Symptoms: Difficulty breathing, nausea, muscle twitching**
- **Decon: M291, flush eyes w/water, DS2/STB, soap / detergents**
- **Persistency: Heavy concentrations - long periods / cold - months**
- **Rate of Action: Very rapid, death within 15 minutes**

Blister Agents

Mustards

- **Battlefield Use: Restrict Terrain**
- **Color and Smell: No color to yellow, garlic or horseradish**
- **Treatment: Burns & blisters (drain blister - control spill)**
- **Symptoms: Blisters, irritation, damage eyes/temp blindness**
- **Decon: M291, flush eyes w/water, DS2/STB, soap / detergents**
- **Persistency: 1-2 days in average conditions / cold = weeks/months**
- **Rate of Action: Delayed, normally symptoms in 4-6 hrs**

SECOND ONLY TO NERVE AGENTS

AS A CONCERN TO THE MILITARY

Distilled Mustard (HD)

$ClCH_2CH_2- S - CH_2CH_2Cl$

Blood Agent - Hydrogen Cyanide (AC)

- **Battlefield Use: Quick Acting Agent, Surprise Attack**
- **Color and Smell: Colorless, slight bitter almond odor**
- **Treatment: Oxygen and medical attention**
- **Symptoms: Accelerated rate of breathing**
- **Decon: None**
- **Persistency: Relatively short, non-persistent**
- **Rate of Action: Very rapid, death within 15 minutes**
- **Blood agent of choice in threat countries**
- **Easy to produce / purchase**
- **Protection: MASK**

H-C≡N

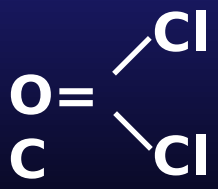
Blood Agent - Cyanogen Chloride (CK)

- **Battlefield Use: Quick Acting Agent, Surprise Attack**
- **Color and Smell: Colorless, pugnent, biting odor**
- **Treatment: Oxygen and medical attention**
- **Symptoms: Same as AC**
- **Decon: None**
- **Persistency: Relatively short, non-persistent**
- **Rate of Action: Very rapid, death within 15 minutes**
- **Protection: MASK… high concentrations of CK degrade mask filters**

Cl-C ≡N

Choking Agent - Phosgene (CG)

- **Battlefield Use: Delayed action casualty agent**
- **Color and Smell: Colorless, cut-grass odor**
- **Treatment: Oxygen and medical attention**
- **Symptoms: Choking, can cause dry-land drowning**
- **Decon: None**
- **Persistency: Relatively short, non-persistent**
- **Rate of Action: Delayed, no ill effects for up to 3 hours**



Field Behavior of Chemical Agents

Variables

- Wind
- Temperature
- Air Stability
- Humidity
- Precipitation

Field Appearance

- Vapors
- Aerosols
- Liquids

Traditional Atmospheric Conditions

Lapse - (Unstable)

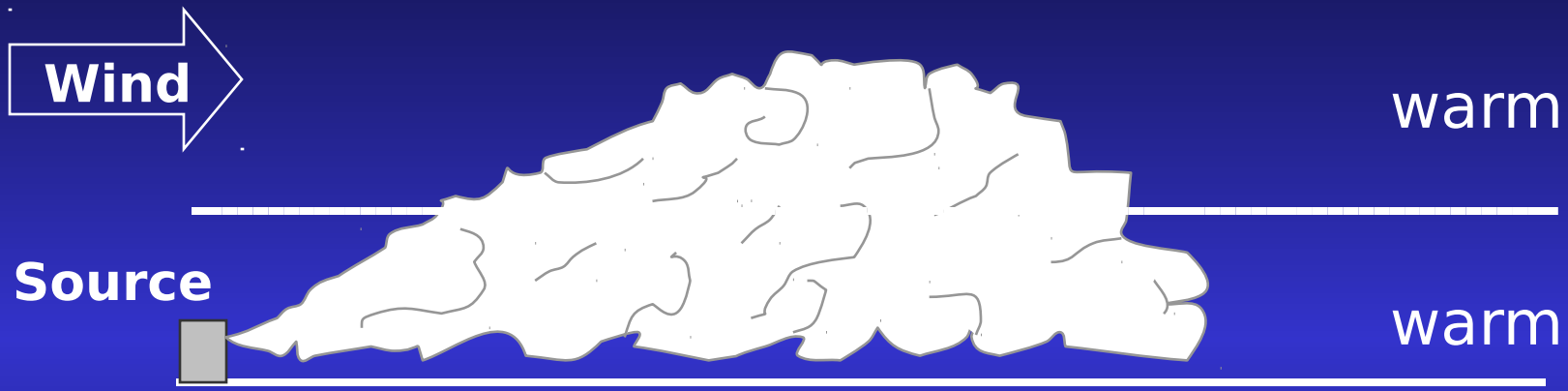
Neutral - (Favorable)

Inversion - (Stable)

Lapse - (Unstable)

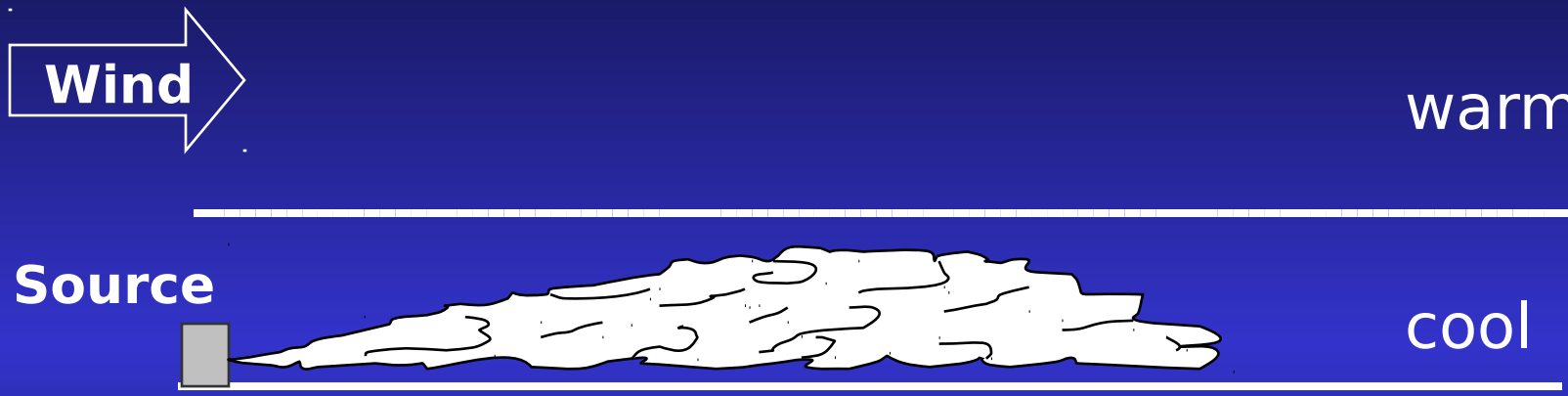
- **Least favorable for employment of chemical weapons.**
- **Used when deploying smoke to create a smoke curtain or wall of smoke between forces.**

Neutral - (Favorable)



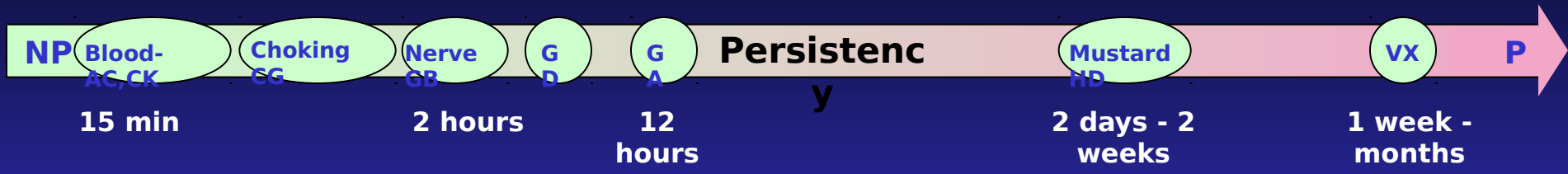
- **Favorable for employment of biological weapons.**
- **Provides the best condition for large area smoke coverage to conceal actions of friendly forces.**

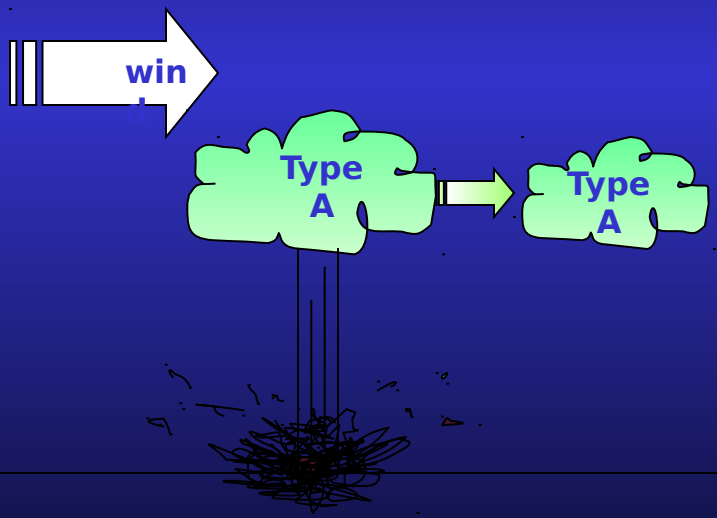
Inversion - (Stable)



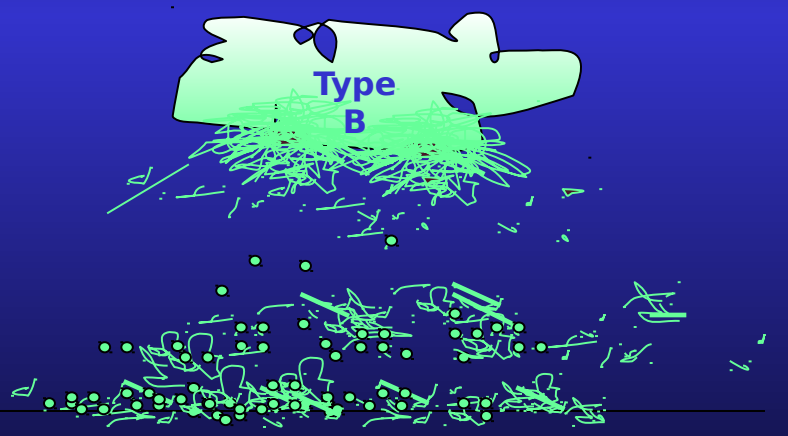
- **MOST favorable for employment of chemical weapons.**
- **Good condition to deploy smoke to cover river crossings.**

Persistency





Air-contaminating Ground Bursts

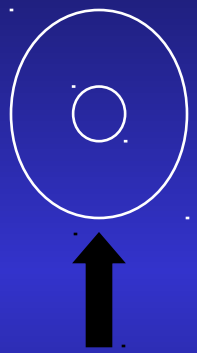


Ground-contaminating Air Bursts

Chemical Agent Prediction

Type A, Case a

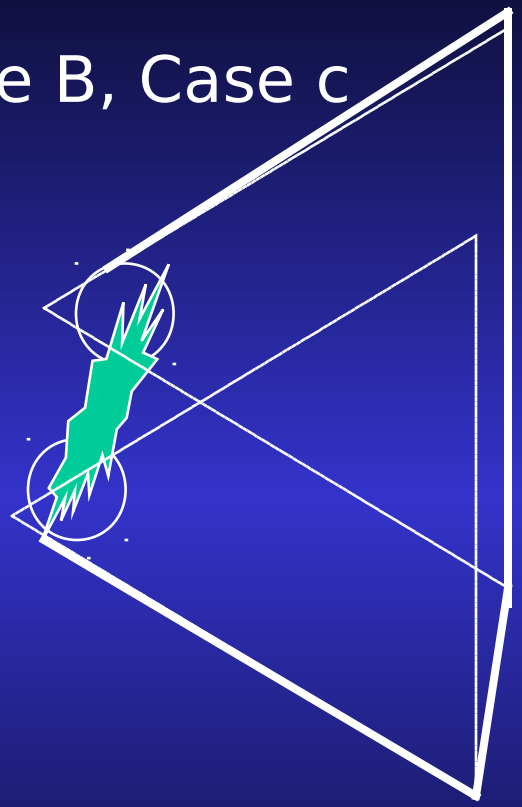
Type B, Case d

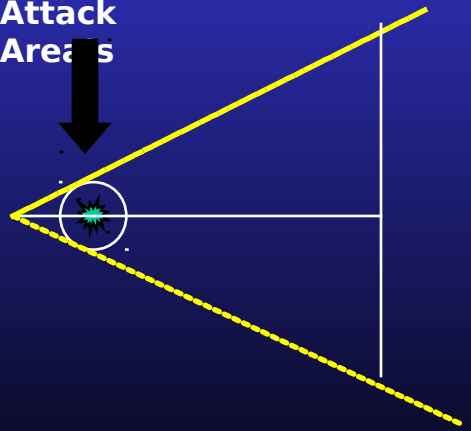


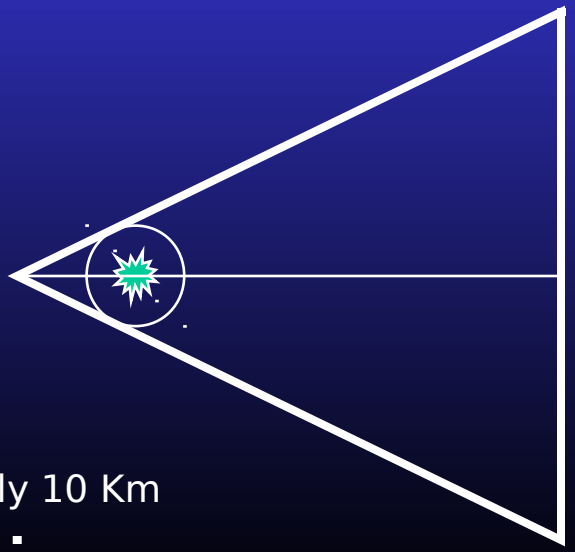
1 Km
Attack
Area s

Type B, Case d (Special)

Type B, Case c







Type B, Case b

(2 Km Attack Area, Distance 10 Km Ma

Type B, Case a (Only 10 Km Distance)

Type A, Case b (Up to 50 Km)

Biological Warfare Agents

Pathogens & Toxins

Pathogens: **organisms that cause disease in hum**

bacterial agents: anthrax, plague, tularemia &
viruses: smallpox, VEE, Marburg & Ebola viruse

Toxins: **poisonous compounds produced by living organisms**

botulinum, SEB, ricin

Anthrax

- Infects - skin, lungs, gastrointestinal track.
- Caused by - spore forming bacteria.
- Route of Entry - inhalation of spores, eating infected meat, or via wounds
- Treatment - antibiotics, tetracycline and erythromycin.
- Symptoms - fever, fatigue, cough, respiratory distress, shock and death occurs in 24 - 36 hours.
- Incubation - 1 to 6 days.
- Persistency - spores remain viable for years in soil.

Toxins

Poisonous substance, produced and derived from living plants, animals, or microorganisms.

Neurotoxins - interfere with nerve impulses

Cytoxins - disrupt and destroy cells, act like food poisoning or disease

Biological Warfare Agents

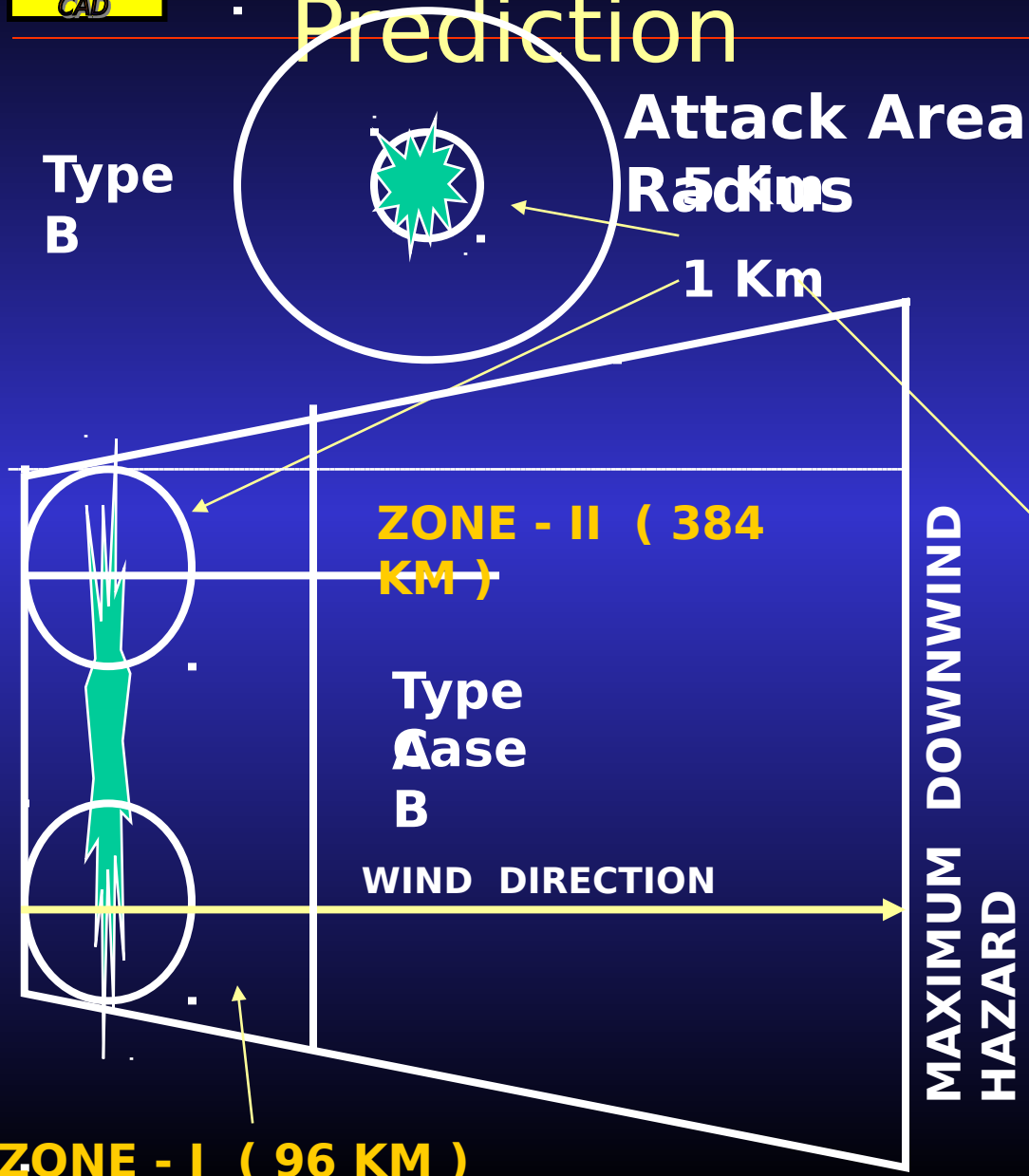
Advantages:

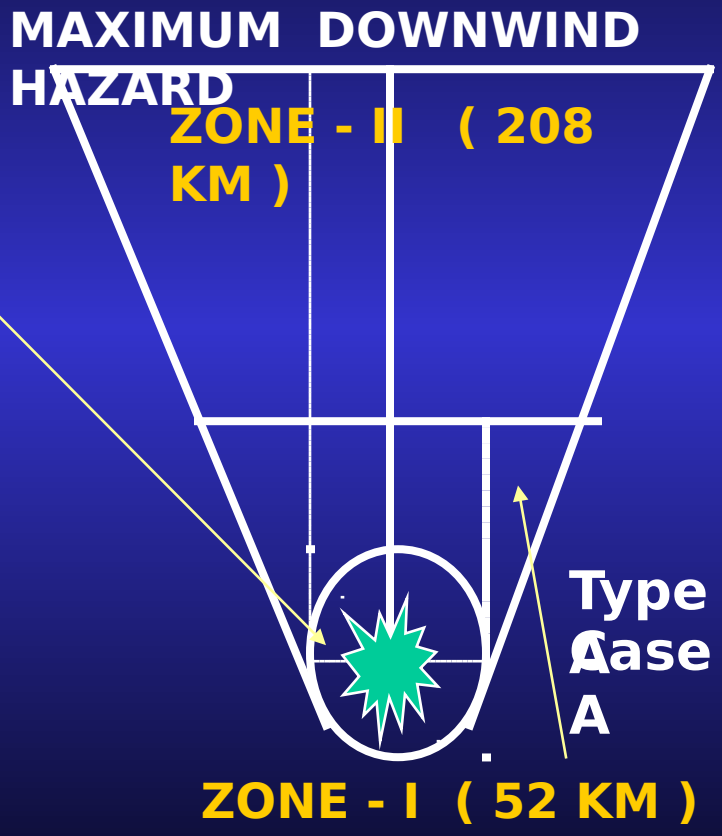
- No reliable BW detection devices currently ava
- No recognizable signals to human exposure
- Can specifically target personnel, crops, livest specific kinds of materiel.

Disadvantages:

- ultimate consequences uncertain
- potential for international outrage

Biological Hazard Prediction





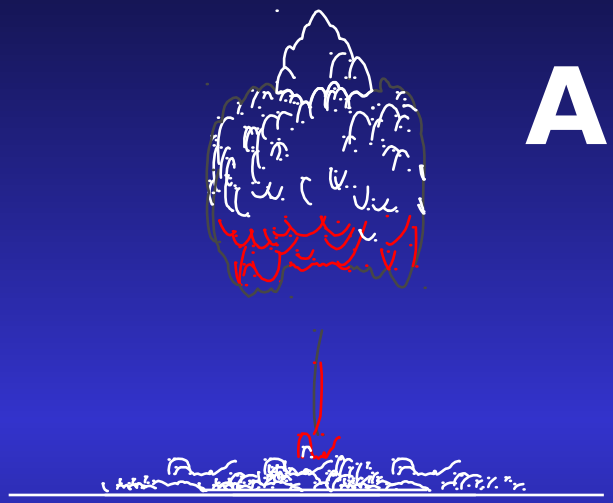
BIOLOGICAL AGENT DEFENSE

Good Health !

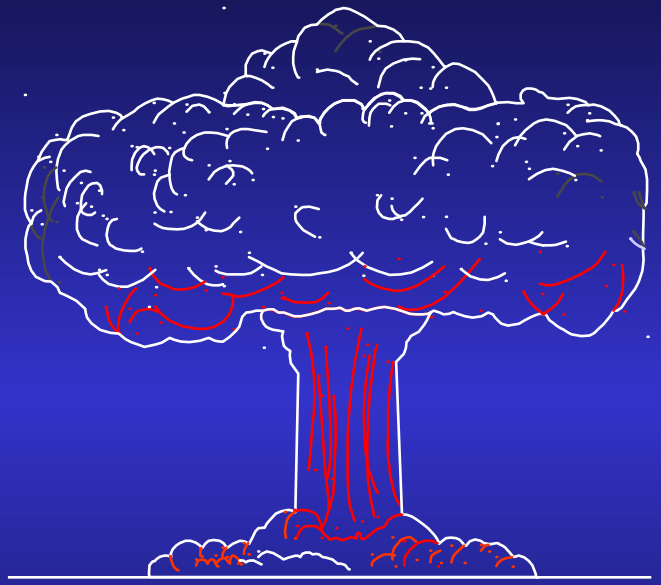
- Up-to-date Immunizations
- Good Hygiene
- Area Sanitation
- Physical Conditioning

Describe how nuclear weapons and radioactivity effect military operations.

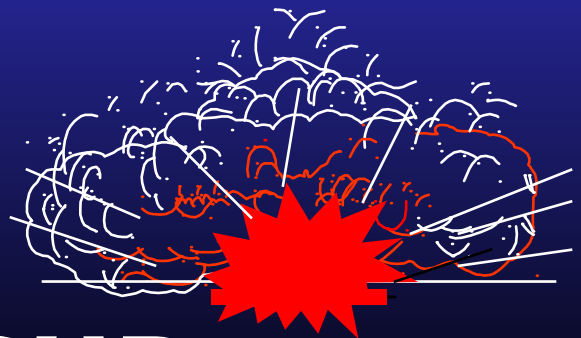
TYPES OF NUCLEAR BURST



AIR

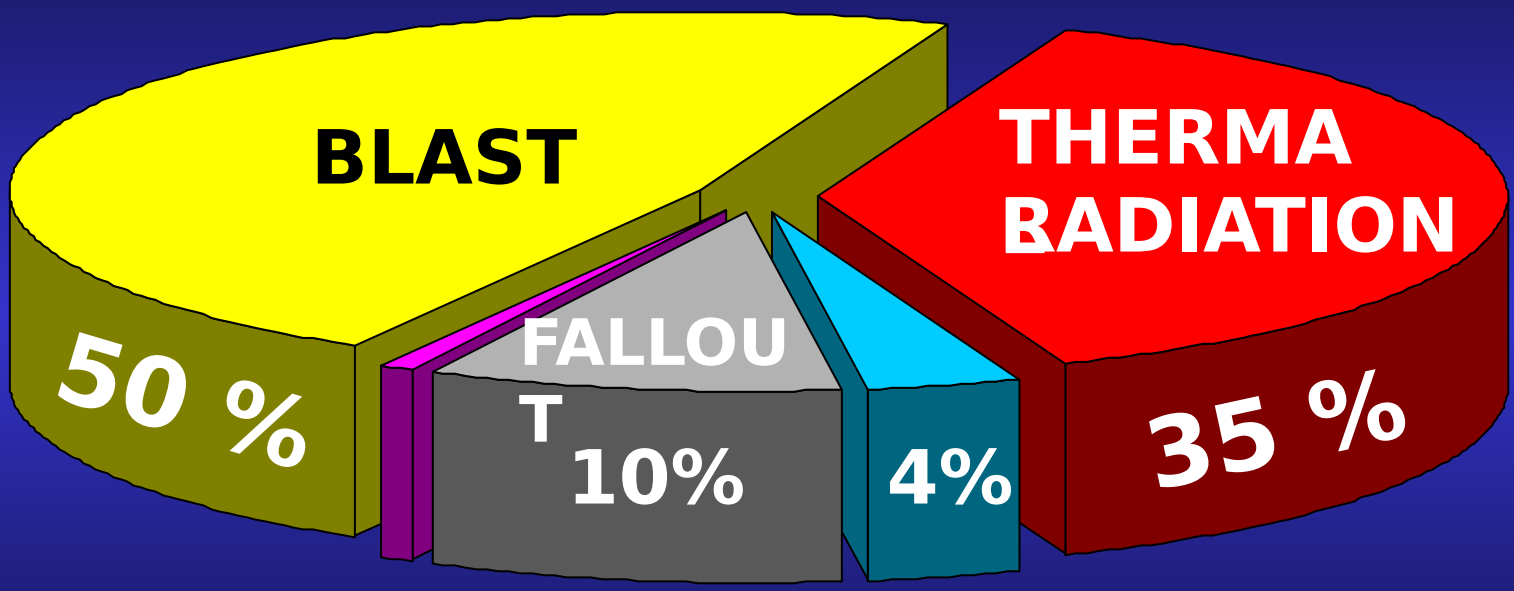


SURFACE



SUB - SURFACE

NUCLEAR EXPLOSION EFFECTS



EMP
< 1
%

4%
INITIAL
RADIATION

BEFORE A NUCLEAR ATTACK

- Foxholes (with overhead protection)
- Improved positions / shielding (avoid dark colors)
- Secure supplies and equipment & cover it.
- Improve shelters (reinforced)
- Redundancy of critical systems & equipment
- Reconstitution (fix your losses)

Best Defense: Dig in your positions / Distance

- Mitigation techniques (OEG, avoid

DURING A NUCLEAR ATTACK

- Drop flat to the ground, close eyes
- Secure weapon / equipment, rotate body head toward blast wave
- Remain calm, count flash-to-bang time
- Stay down until second blast wave passes, and large debris stop falling

AFTER A NUCLEAR ATTACK

- Remain calm
- Check for injuries or wounds to yourself and fellow soldiers
- Prepare & submit NBC - 1 report

“Flash Precedence” - to higher headquarters

- Begin monitoring and take radiation protective measures
- Continue mission

LOW-LEVEL RADIATION AND DEPLETED URANIUM

- Understand the threat (ALPHA PARTICLES)
- **CONTAMINATION AVOIDANCE**
- MOPP
- Goggles / Handkerchief
- Detection Equipment (AN/PDR-77) / VDR-2
- Marking and Reporting
- Decontamination

Five Concepts of NBC Defense

The five major concepts of NBC defense are:

- Contamination Avoidance
- Individual Protection
- Collective Protection
- Decontamination
- Consequence Management

Contamination Avoidance

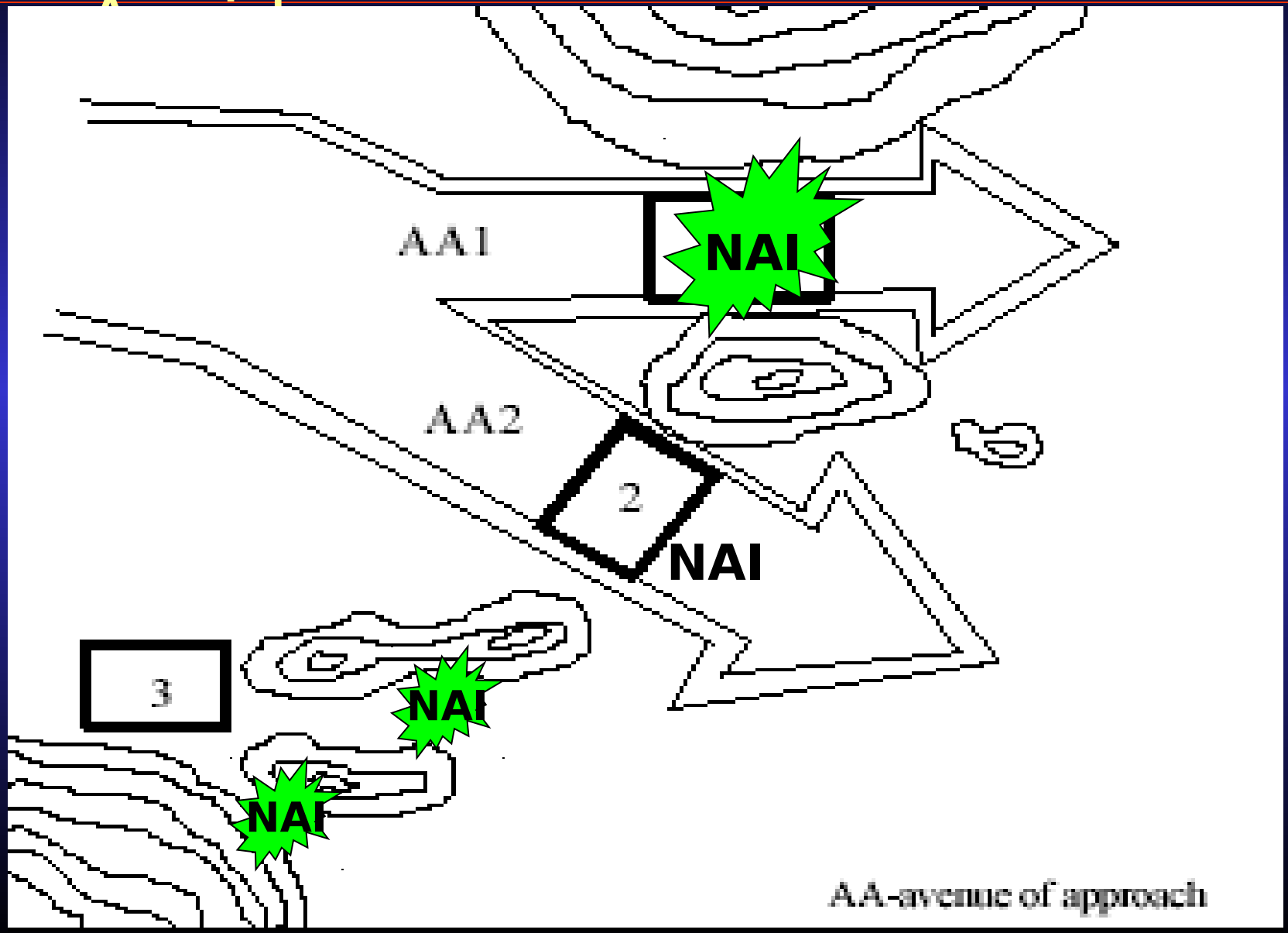
Assess NBC threat

Assess threat capabilities

Assess Toxic hazards

Assess Depleted Uranium (DU) hazards

NBC Contamination



Contamination Avoidance (cont.)

- NBC recon (FOX and BIDS)
- By-pass NBC hazards
- Detect and verify NBC hazards
- Use warning and reporting system

NBC Individual Protection

Conduct MOPP analysis

Conduct immediate decon

Keep IPE ready

Collective Protection

Use CP shelters or vehicles

Harden fixed facilities

NBC Decontamination

Individual decon kits replenished

Consider speed, need, limits, and priority for:

- Operational decon
- Thorough decon

Execute decon operations

Request decon support

Consequence Management

Conduct NBC vulnerability analysis

Coordinate with civil authorities to maximize use of their capabilities

Use civilian assets to the extent possible

Train first responders as required

U.S. Policy on WMD

Nuclear = Close control

- **Reserve the right to conduct “First Strike” attack**
- **Do not target population centers**
- **President authorizing official for use**

Biological = No use

Chemical = No use

Identify the components of and the procedures for using the NBC Warning and Reporting System (NBCWRS)

ORIGIN AND FLOW OF NBCWRS

Div S-2 / S-3

Attached and Supporting Units

Bde S-2 / S-3

Attached and Supporting Units

Bn S-2 / S - 3

Co/ Trp / Btry

NBC 2, 3, and 5 * Reports

NBC 1 and 4 Reports

First use = FLASH, _____ _Subsequent = IMMEDIATE

NBC 6 * * Reports

* Best sent as an overlay

* * Sent only when

GTA 3 - 6 - 8

Graphic Training Aid

*** GTA 3-6-8**
NBC
Warning and Reporting System

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August 1996
HEADQUARTERS
DEPARTMENT OF THE ARMY

*Supersedes GTA 3-6-5, August 1993

SITUATION (A)

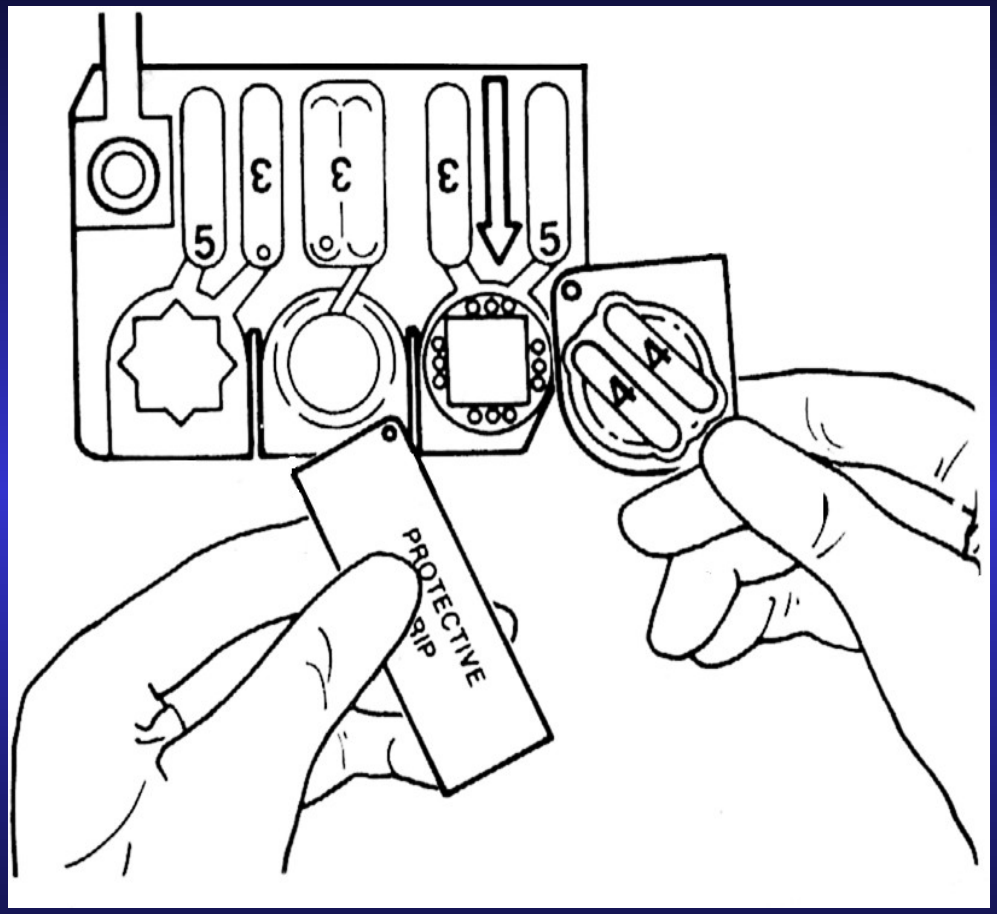
The time is 070800ZSep 2000. NBC weapons have not been used in Theater. You are the 53d ID(M) assistant S1 located at NK575015. A FAST team SGT located at NJ582998 observes his alpha team come under artillery attack at NJ585995. Alpha team reports that their Chemical Agent Alarm sounded, and they have gone to MOPP level 4. The team detects the presence of a Nerve Agent using an M256A1 chemical detector kit.

SITUATION (B)

The time is now 070900ZSep2000 the FAST team SGT located at Grid NJ582998 is talking to you on the MSE telephone which emits a loud squeal. He sees a huge, brilliant flash of light at 270 degrees magnetic from his position. After 10 seconds he hears a tremendous explosion and sees a dark mushroom cloud rising from the ground at vic NJ565975. This is the second nuclear attack in division sector. The first occurred at at 070600ZSep2000 at NJ585965.

NBC Equipment

M256 Chemical Agent Detector Kit

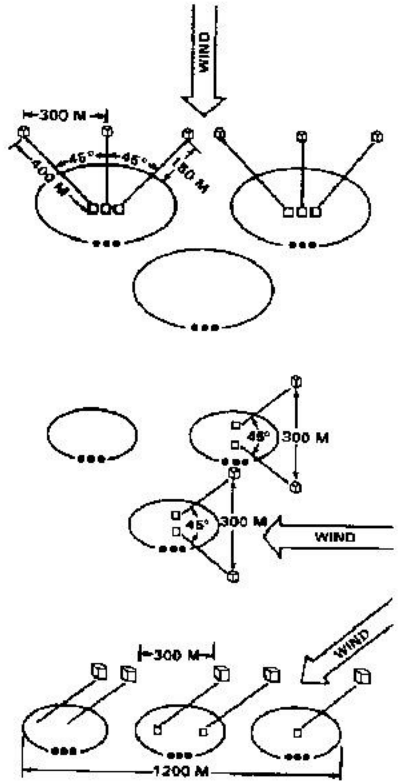


Detect and identify nerve, blood or blister contamination

M22 Automatic Chemical Agent Alarm

Average Air Temperature		Maximum Number of 12-hour Missions	
10	–13	3	Do not use below 20°F (–4°C).
0	–17	2	
–10 to –40	–22 to –40	1	

Fixed Emplacement of M8 or M8A1 Alarms

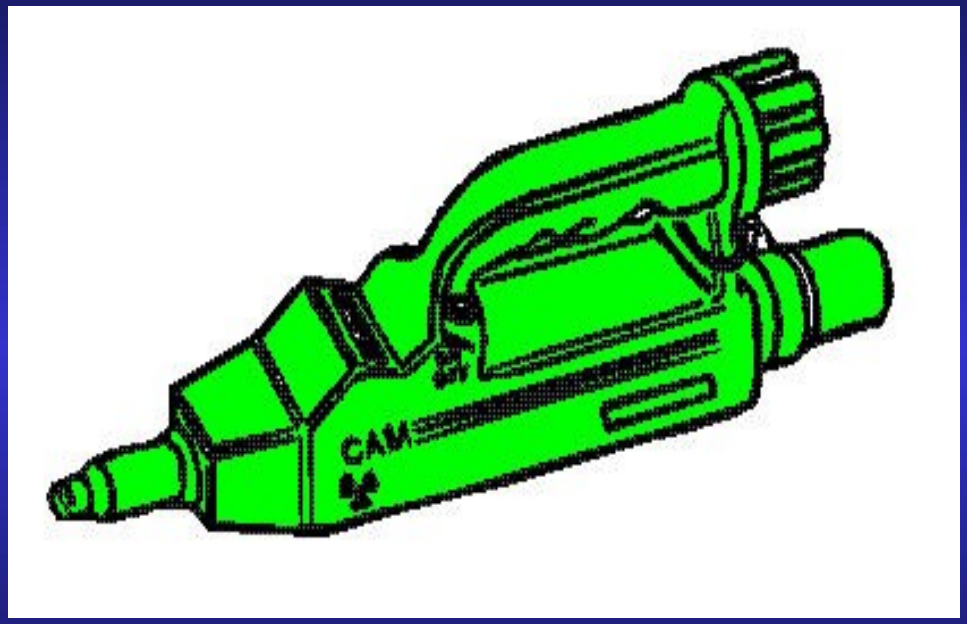


Detects Nerve and Blister Agents

Improved Chemical Agent Monitor (ICAM)

DETECTS VAPORS

- **Nerve - GA, GB**
- **Blister - H, L**



- **Use - Check personnel or equipment, search out clean areas, and monitor the effectiveness of decontamination.**

Decontaminating Kit, Skin: M291

Replaces M258A1

MOPP Levels

MOPP Ready
(MOPP Gear available within 2 hours)

MOPP Equipment	MOPP Ready
Mask	Carried
Overgarment	Ready
Vinyl Overboot	Ready
Gloves	Ready
Helmet Protective Cover	Ready
Chemical Protective Undergarment	Ready

MOPP Zero

(MOPP Gear within arms reach)

MOPP Equipment	MOPP ZERO
Mask	Carried
Overgarment	Available
Vinyl Overboot	Available
Gloves	Available
Helmet Protective Cover	Available
Chemical Protective Undergarment	Available

MOPP1

MOPP Equipment	MOPP 1
Mask	Carried
Overgarment	**Worn**
Vinyl Overboot	Carried
Gloves	Carried
Helmet Protective Cover	Available

MOPP2

MOPP Equipment	MOPP 2
Mask	Carried
Overgarment	**Worn**
Vinyl Overboot	**Worn**
Gloves	Carried
Helmet Protective Cover	**Worn**

MOPP3

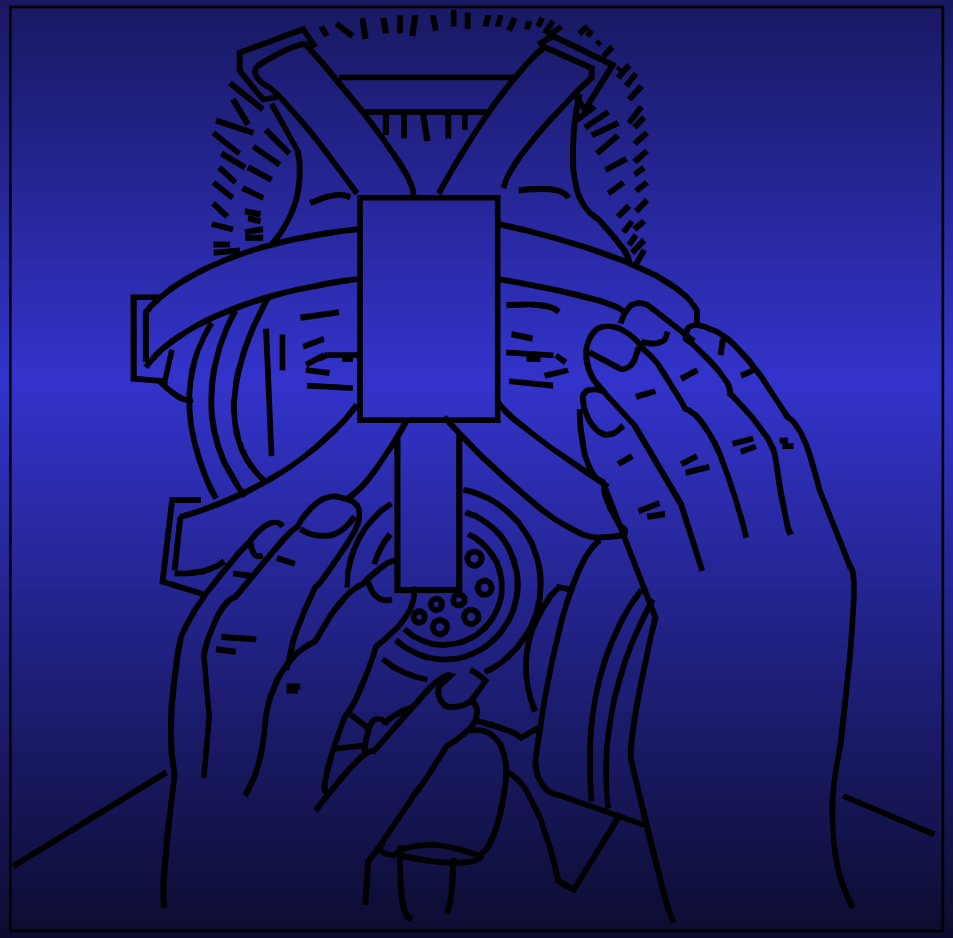
MOPP Equipment	MOPP 3
Mask	**Worn**
Overgarment	**Worn**
Vinyl Overboot	**Worn**
Gloves	Carried
Helmet Protective Cover	**Worn**

MOPP4

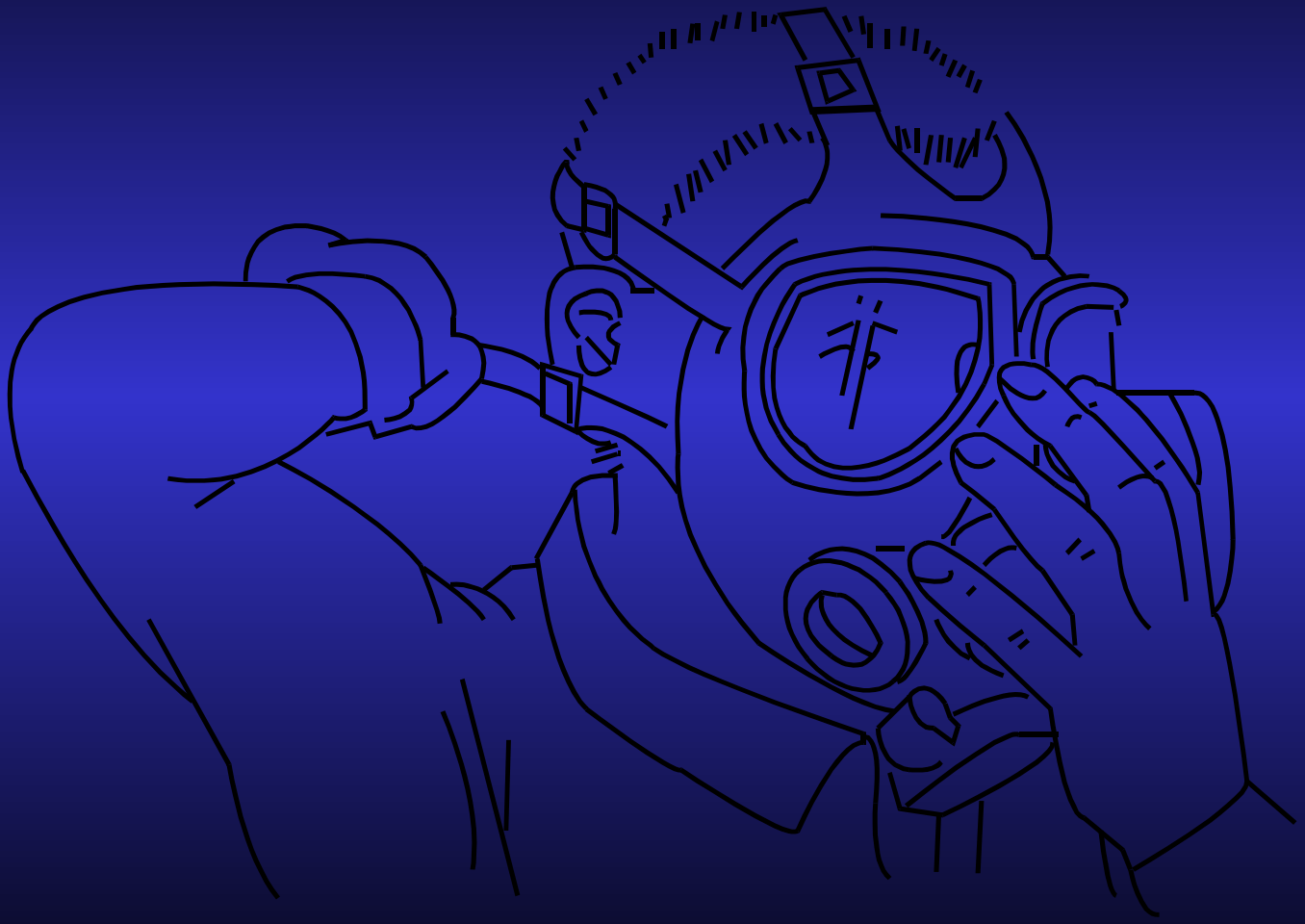
MOPP Equipment	MOPP 4
Mask	**Worn**
Overgarment	**Worn**
Vinyl Overboot	**Worn**
Gloves	**Worn**
Helmet Protective Cover	**Worn**

M40 Mask

M40 Mask



M40 Mask



M40 Mask